

## Appendix B

### **PROPOSED MODIFICATIONS FOR OCEAN BAR CHANNEL REALIGNMENT, BENEFICIAL USES OF DREDGED SAND, AND EXPANSION OF DREDGING METHODS FOR WILMINGTON HARBOR WILMINGTON, NORTH CAROLINA**

Source: Wilmington District, U. S. Army Corps of Engineers, September 1999

#### **1.00 PURPOSE AND NEED FOR ACTION**

1.01 General. Wilmington Harbor is a 37-mile-long Federal navigation project located in southeastern North Carolina along the Cape Fear and Northeast Cape Fear Rivers (Figure 1). It connects deep water of the Atlantic Ocean with the Port of Wilmington. Congressionally-authorized improvements scheduled to start in April 2000 will include deepening the navigation channel by 4 feet and widening portions of the project. In addition, the harbor entrance channel through the ocean bar will be established on a new alignment selected to reduce deepening costs and potential environmental impacts associated with rock blasting and excavating live coral bottom along the old channel alignment. Beach-compatible sand from the new alignment will be made available for placement on nearby beaches in Brunswick County. Dredged sand from disposal islands and channels of the lower Cape Fear River will be made available for placement for maintenance of existing, authorized Federal shore protection projects along the beaches of lower New Hanover County. The overall project dredging and disposal activities may be conducted using a variety of equipment and disposal alternatives in order to facilitate contracting for accomplishment of the work.

1.02 Project History. Improvement of the Cape Fear River for navigation was begun by the State of North Carolina in 1822 and continued until 1829 when the Federal government took over these responsibilities. Until 1870, harbor improvements and maintenance were conducted intermittently but have been carried on continuously since then. Channel depths and widths have been increased over time to accommodate the increasingly larger ships calling at the port. The new improvements for the harbor have been designed to alleviate navigation constraints that now require larger vessels to travel lightloaded or to wait for high tide. Lightloaded vessels force shippers to pay for unused space. Vessels awaiting high tide continue to incur operating costs while delayed. Reducing these problems will lower shipping costs and improve the economic viability of the port.

1.03 Existing Project. The pending construction plan integrates harbor improvements that were recommended and authorized separately as the (1) Wilmington Harbor - Northeast Cape Fear River project, (2) Wilmington Harbor - Channel Widening project and (3) Cape Fear - Northeast Cape Fear Rivers project. This plan, referred to as the "96 Act Project" provides for increasing the authorized navigation depth of the entire channel from the Atlantic Ocean to the Port of Wilmington by 4 feet and widening selected portions of the project. New authorized

project depths are 44 feet at mean lower low water (mllw) through the ocean bar, then 42 feet mllw up the Cape Fear River to and including the Anchorage Basin immediately upriver from the State Ports Authority (SPA) dock, then 38 feet mllw upstream into the Northeast Cape Fear River to 750 feet beyond the Hilton Railroad Bridge, and finally 34 feet mllw upriver to the turning basin near the upstream limits of the project in addition, an overdepth zone of 2 feet is allowable for dredging inconsistencies throughout the project length, and 1 foot of additional overdepth is required in areas of rock. Existing authorized channel widths are 500 feet for the ocean bar and entrance channels to Southport, then 400 feet upstream to the Hilton Railroad Bridge, then 200 feet wide for 1.67 miles to the head of the project, with increased widths at bends, the anchorage basin, and turning basins. New project horizontal expansions include widening Lower Midnight, Upper Midnight and Lower Lilliput Channels from 400 to 600 feet over a distance of 6.2 miles; widening five turns and bends by 100 to 200 feet; widening the Fourth East Jetty Channel from 400 to 500 feet over a span of 1.5 miles; extending the Anchorage Basin near the SPA upstream 300 feet; widening the channel in the Northeast Cape Fear River from 200 to 250 feet starting 750 feet upstream of the Hilton Railroad Bridge and proceeding upstream to the turning basin near the project limits; and widening this turning basin from 700 to 800 feet. General geographic features and the names of channel reaches comprising the harbor are shown in Figure 1.

1.04 Proposed Action. The actions proposed in this document reflect project changes that have been developed since the 1996 publication of the Final Feasibility Report and Environmental Impact Statement for the Cape Fear - Northeast Cape Fear Rivers Comprehensive Study. The following modifications to the Wilmington Harbor project are included:

- construction and maintenance of the harbor entrance channel (Baldhead Shoal Channel) along a new alignment through the ocean bar,
- placement of sand dredged from the ocean bar channel, riverine channels upstream through Reaves Point channel, and/or the larger sandy disposal islands of the lower Cape Fear River on area beaches or in the littoral zone,
- backfilling of the abandoned portion of the old ocean bar channel with material unsuitable for beach or littoral zone placement,
- placement in the ODMDS of all dredged sediment that does not go to the beaches, the littoral zone, or abandoned channel, and
- establishment of a clear, comprehensive plan for utilization of all types of dredging equipment and disposal alternatives that are appropriate for use in each specific portion of the project

New Alignment for the Ocean Bar Channel. The authorized deepening of the ocean bar channel, if conducted along its present alignment would involve the removal of extremely hard rock. Based upon recent difficulties in attempting to dredge this rock, it is expected that further rock removal would require extensive blasting and would be very slow and expensive. A 3.5-mile seaward channel extension would also be required to reach water of the same natural depth as the

new channel. Thus, its present length of 5.8 miles would need to be extended to a new total length of 9.3 miles seaward from the inlet. This seaward extension would pass through a substantial amount of live coral and other ecologically valuable, live hard bottoms. To resolve these problems, a new channel alignment has been selected which would: (1) avoid the need for rock blasting and its associated environmental impacts; (2) avoid coral/live hard bottom in the path of extending the existing alignment; (3) shorten the distance to natural deep water (i.e., the 46-foot contour) to about 6.7 miles rather than 9.3 miles on the existing alignment; (4) save about \$40 million in construction costs by avoiding the need for rock removal; (5) reduce channel construction time; (6) avoid 1 extra foot of overdepth that would be required when the channel bottom is rock; and, (7) locate the channel over deeper rock so that future deepening, if ever required, would require less blasting. These advantages strongly favor the establishment of the new alignment rather than deepening and extending the existing alignment. The old and new alignments of the ocean bar channel appear on Figure 2.

The new alignment will utilize a portion of the old channel near the inlet, but will then deviate by adding two channel bends which, in turn, will require channel wideners at these locations in order to facilitate ship maneuverability and navigation safety. The new channel will then pass through the existing ODMDS as it proceeds seaward. After taking into account the area within the old channel alignment and the ODMDS, it is estimated that the net new impact area of the new alignment will be about 439 acres of ocean bottom. Deepening and extending the channel on the old alignment would create a net new impact area of about 285 acres. Thus, the new channel alignment will affect about 154 acres more than modification of the old alignment.

Construction of the new channel across the ocean bar will require the removal of approximately 13.1 million cubic yards of sediment consisting of sands, silts, and clays. This volume consists of about a million cubic yards of sandy material and about 12 million cubic yards of fine, silty material. The material may be removed from the channel by hydraulic pipeline or hopper dredges; hopper dredges with pumpout capability; or bucket dredges. Any of this equipment may be used in conjunction with barges or scows for sediment transport. It is estimated that maintenance dredging of this channel will be required approximately once a year and that about 1.1 million cubic yards of dredged material will be derived annually.

Beneficial Use of Project-derived Sand. Historically, dredged material has been considered a waste material. Prior to the National Environmental Policy Act (1969) and the Federal Water Pollution Control Act (1972), its treatment often consisted of unconfined disposal into waters and wetlands adjacent to navigation channels. More recently, it has been deposited within diked disposal islands or transported to an Ocean Dredged Material Disposal Site (ODMDS) located offshore. However, dredged material is now recognized as a valuable resource which can be beneficially used in various ways depending upon its physical and chemical characteristics and its location. Sand is especially valuable for its role in beach replenishment.

Beach-quality sand dredged during construction and maintenance of the new ocean bar channel will be made available for placement on area beaches, to the extent feasible. Planning for the placement of this sand is being coordinated through the Brunswick Beaches Consortium, which represents the interests of Bald Head Island, Caswell Beach, Oak Island (Yaupon Beach and Long Beach), and Holden Beach in acquiring as much sand as possible from the Wilmington Harbor project (Figure 3). These communities are currently working with Federal and State governments to obtain funding assistance for sand placement, possibly through the authority of Section 933 of the Water Resources Development Act of 1986. Section 933 authorizes 50 percent Federal sharing of the extra costs of using sand dredged from Federal navigation improvements and maintenance for beach nourishment. Sand placed through the use of this authority must provide benefits at least equal to the cost of placement, but future nourishment of the beach is not a project requirement i.e., the beach does not become a Federal shore protection project with a continuing maintenance obligation. Placement of sand on the Brunswick County beaches is designed to begin at mean high water (elevation +2.5 ft mllw) and to extend seaward about   ??   feet during construction. It is anticipated that natural forces will immediately reduce this beach width to about   ??   feet after a period of about 6 months. During placement deposited sand is designed not to exceed elevation +8.0 feet The design beach profile is shown at true scale in Figure 4 and exaggerated scale in Figure 5.

Beach-quality sand will also be dredged during the deepening of the riverine channels upstream through Reaves Point channel. Sand from these channel segments as well as the larger, sandy disposal islands in the lower river will be made available to the beach communities of lower New Hanover County, i.e., Carolina Beach and Kure Beach, to be used for maintenance of their existing Federal shore protection projects. These projects were previously authorized and constructed, and Wilmington Harbor sand would merely be used in place of sand derived from other approved sources, including offshore borrow sites.

Should the beach communities not be in a position to accept all the sand generated by construction of the Wilmington Harbor improvements, the excess sand would be placed in the littoral system, to the maximum extent practicable, so as to retain it within the active coastal sand system.

Backfilling the Abandoned Channel. After the new ocean bar channel is completed, the abandoned portion of the old channel (seaward of a point located about 12,000 feet outside the inlet throat) will be backfilled using fine sediments from maintenance dredging or from channel deepening in other portions of the harbor. This refilling process may occur over a period of years but would accelerate the shoaling process which would occur naturally in the abandoned channel. As a result the ocean bottom would become flatter more quickly. This is expected to benefit the commercial fishing industry because trawling activities could likely be resumed along the old channel alignment After backfilling of the old channel is complete, fine-grained material dredged from the new ocean bar channel will go to the ODMDS.

Disposal of Dredged Material at the ODMDS. The Wilmington ODMDS will be available for disposal of any harbor sediments that are not suitable for beach or littoral zone placement (due to > 10 percent silts and clays). In addition, if neither beaches nor littoral zone placement can accommodate all the sand generated by the harbor improvements and maintenance, any remainder may go to the Wilmington ODMDS. The existing ODMDS will be utilized until its capacity is exhausted, which is expected to occur within the next few years. Afterwards, a new ODMDS will be used. The future ODMDS is already being planned jointly with the US Environmental Protection Agency and is being coordinated through a separate process.

Expansion of Dredging Methods. Dredging methods currently approved for use in various sections of Wilmington Harbor include hydraulic pipeline, hopper, and bucket dredges with scow. Overflowing of hopper dredges and scows to achieve economic loading has also been approved for some portions of the harbor, and has been conditionally approved for additional portions subject to monitoring the overflow plume. Approved disposal sites include the ODMDS, confined disposal facilities (CDFs) on islands along the river, and the Eagle Island CDF located near river mile 25. The same dredging methods and disposal sites are planned for future use. However, it is proposed that all dredging methods be allowed throughout the Wilmington Harbor project from its upstream end (mile 31) downstream to and including the ocean bar channel (Baldhead Shoal Channel), providing that their use is consistent with appropriate environmental protection measures, including those imposed to safeguard water quality, fish and wildlife, and endangered and threatened species. It is also proposed that the various types of dredging equipment be allowed to operate by methods that achieve greater economic efficiency (such as overflowing hopper dredges and scows to achieve economic loading) so long as these methods do not violate regulatory restrictions and conditions. Furthermore, it is proposed that placement of dredged material from any portion of the harbor may be at any approved dredged material disposal site, so long as this is in accordance with Section 404 of the Clean Water Act or Section 103 of the Marine Protection, Research, and Sanctuaries Act as appropriate. Figure 6 shows the dredging methods already approved and those proposed for approval for all the channel segments of Wilmington Harbor.

1.05 Proposed Construction Schedule. Construction of the new ocean bar channel would be accomplished in conjunction with the other harbor improvements scheduled to start in the year 2000. Overall construction for the harbor improvements is expected to require nearly 6 years (68 months). Within this period, work on the ocean bar channel is scheduled to start about 1 April 2000 with a contract to dredge fine-grained sediment and deposit it in the existing ODMDS. A second contract anticipated to start in November 2000 would include work in the sandy portion of the new channel, and plans are being coordinated to place the sand on nearby beaches. Beach placement of the million cubic yards of sand to be derived from channel construction is expected to require approximately 26 consecutive months of dredging and disposal.

Also, dredging in the riverine portion of the project is scheduled to begin July 2000. Sandy material from Disposal Islands # 3 and # 4 (Figure 7) and the river channels from Reaves Point channel downstream will be made available to the non-Federal sponsors of existing, authorized beach nourishment projects of lower New Hanover County (i.e. Carolina Beach and Kure Beach) for routine maintenance of their projects. This sand would merely represent an alternate source of beach nourishment material.